International Journal of Pharmacy and Technology, 2016, vol.8, N4, pages 24231-24241

Testing method for riveted connections using the free oscillation technique. Numerical simulation

Saifullin E., Vankov Y., Busarov A.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2016, International Journal of Pharmacy and Technology. All rights reserved.The article presents the results of studies on the development of methods and diagnostic system for instrumental quality control of riveted connections using the automated free oscillation technique. Based on the analysis of the known non-destructive testing methods of a riveted connection, it has been concluded that application of the free oscillation technique is very promising for quality control in the manufacture and repair of the gas turbine engine's stators in order to identify different types of defects. The free oscillation technique (FOT) relies on excitation of freely damped elastic oscillations in a test object or part thereof and analysis of parameters of these oscillations. The FOT informative parameter is the change in the spectrum of free elastic oscillations of test objects. In order to accelerate the development of certain testing methods, the numerical experiments were carried out to determine the natural frequencies of suitable and defective riveted connections. Following the numerical simulation results, the optimal method of attaching a test disc to blades and informative frequency ranges were determined; they indicate that some defects of riveted connections are available.

Keywords

Finite element method, Free oscillation technique, Non-destructive testing, Numerical simulation, Riveted connections